12/28/07 UPDATE

LABORATORY-BASED BIOLOGY SCIENCE CURRICULUM

The goal of this curriculum is to increase the number of students meeting state science standards at the high school level. This can be done through this course of study in biology, which is aligned with state science standards and meets the entrance requirements of post-secondary institutions.

Numbers in parentheses reference the Nebraska Twelfth-Grade Science Standards.

Table of Contents

This project is funded by NCLB Title II, Part B, Math/Science Partnership Funds.

SECTION I **SCIENTIFIC INQUIRY**

Concepts and Skills	Suggested Activities Note: 1 Day~45-50 Minute Period	Suggested Assessments
12.2.1 Basic Inquiry (5 days initially & 3-5 days per section) a. Formulate questions and identify concepts that guide scientific investigations. b. Design and conduct scientific investigations. c. Use technology and mathematics to improve investigations and communications. d. Formulate and revise scientific explanations and models using logic and evidence. e. Recognize and analyze alternative explanations and models. f. Communicate and defend a scientific argument.		
A. Features of Inquiry		
1. Engaging in Scientifically Oriented Questions a. Questioning b. Predicting c. Forming Hypotheses 2. Responding to Questions using Evidence a. Identifying Variables b. Designing Experiments i. Understand that larger well-chosen samples produce more accurate estimates of the characteristics of the total population. (12.1.2) c. Making Qualitative and Quantitative Observations i. Understand that measurement errors may affect results of calculations. (12.1.3) d. Recording Data 3. Formulating Explanations from Evidence a. Organizing Data i. Understand that the way data are displayed affects interpretation. (12.1.2) 1)Graphs 2)Tables 3)Calculations a) Uses of powers of ten to represent large and small numbers. (12.1.3) 4)Schematics b. Manipulating Data	• Logical arguments • Science versus what is not scientific (belief based) • Sample size and validity • Communicate results in a scientific format *How many drops of water on a penny?* This lab involves student's use of the scientific method to find the number of water drops that can be placed on a penny. Students will then test different variables that may affect the number of drops that the penny can hold. *Fermentation* Investigate carbon dioxide production using molasses (or different sugars) and yeast.	Directed Project • Discuss examples of final projects. • Discuss possible topics • Formulate a project proposal • Establish a timeline for components completion. • Complete sample inquiry projects as a class. • Keep a journal of project progress. • Communicate about final project • Present PowerPoint, paper, etc.

Concepts and Skills	Suggested Activities Note: 1 Day~45-50 Minute Period	Suggested Assessments
c. Interpreting Evidence i. Evaluate the reasonableness of answers to problems. (12.1.2) ii. Understand that a correlation between two variables does not mean that either one causes the other. (12.1.2) iii. Compare data for two groups by using averages and ranges of values. (12.1.3) iv. Describe rate of change by comparing one measured quantity to another measured quantity. (12.1.3) v. Investigate and describe how different characteristics, properties, or relationships within a system change as their dimensions increase or decrease. (12.1.3) d. Creating Models i. Create a physical, mental, or mathematical model to show how objects and processes are connected. (12.1.2) 4. Connecting Explanations to Scientific Knowledge a. Inferring b. Connecting to Existing Models i. Test the usefulness of the model by comparing its predictions to actual observations. (12.1.2) c. Defending Findings i. Evaluate the reasonableness of answers to problems. (12.1.2) 5. Communicating and Justifying Explanations a. Communicating Explanations b. Defending Explanations c. Publishing d. Determining Applications e. Asking Further Questions		

Concepts and Skills	Suggested Activities Note: 1 Day~45-50 Minute Period	Suggested Assessments
12.1.2 Evidence, models, and explanation a. Understand that the way data are displayed affects interpretation. b. Understand that larger well-chosen samples produce more accurate estimates of the characteristics of the total population. c. Sample Activity: Collect data from hay infusion i. Create a physical, mental, or mathematical model to show how objects and processes are connected. ii. Test the usefulness of the model by comparing its predictions to actual observations. iii. Understand that a correlation between two variables does not mean that either one causes the other.		
12.8.1 Science as a Human Endeavor a. Demonstrate ethical scientific practices (e.g., informing research subjects about risks and benefits, humane treatment of animals, truthful reporting, public disclosure of work, and peer review). b. Examine and understand the societal, cultural, and personal beliefs that influence scientists. Eg: Investigate gender and ethnic issues. c. Recognize science as one way of answering questions and explaining the natural world. i. Ethics		
12.8.2 Nature of Scientific Knowledge a. Demonstrate the use of empirical standards, logical arguments, and skepticism in science. b. Create scientific explanations consistent with experimental and observational evidence; make accurate predictions; strive to be logical; respect the rules of evidence; accept criticism; report methods and procedures; and make knowledge public. c. Understand that all scientific knowledge is, in principle, subject to change as new evidence becomes available.		

SECTION II **THE CELL**

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
12.4.1 Cell a. Investigate and describe the form and function of subcellular structures that regulate cell-activities. b. Investigate and describe cell functions (e.g., photosynthesis, respiration, cell division). c. Investigate and understand that complex multicellular organisms are formed as highly organized arrangements of differentiated cells.		
A. Cell Structure (3-4 days)		
1. Cytoplasm 2. Eukaryotic 3. Prokaryotic	Review the use and care of the microscope, identify cell structures, and discuss differences between prokaryotes and eukaryotes. *Interactive Lab Tutorial of the Microscope* The web site has many links to interactive microscope tutorials. Lots of pictures and instructions on how to use the microscope. http://micro.magnet.fsu.edu/primer/anatomy/introduction.html *Basic Microscopy* This web page has microscope basics and contains beginner information. http://www.yesmag.bc.ca/how_work/microscope.html Ready-To-Use Life Science Activities Mark J. Handwerker, Ph.D. ISBN 0-87628-439-x *Ready-To-Use* *Human Biology Health Activities* Mark J. Handwerker, Ph.D. ISBN 0-87628-446-2	Microscope Quiz Demonstrate proper use and care in the lab.
4. Plant and Animal Cell differences	*Onion vs. Cheek Cells* Explain the major differences between plant and animal cells. Investigate the similarities and differences between animal and plant cells. http://www.iit.edu/~smile/bi9114.html http://www.cellsalive.com/cells/3dcell.htm	Lab write up

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
5. 12.8.3 Historical Contributors (e.g. Schwann, Schleiden, & VanLeeuwenhoek) a. Investigate and describe the contributions of diverse cultures to scientific knowledge and technological inventions. b. Understand that changes in scientific knowledge evolve over time and almost always build on earlier knowledge. c. Understand that some advancements in science and technology have long-lasting effects on society.		Oral Report
B. Organelle Function (3-5 days)		
1. Nucleus 2. Mitochondria 3. Ribosomes 4. Endoplasmic Reticulum 5. Vacuole 6. Golgi Apparatus 7. Lysosome 8. Chloroplast 9. Centriole	Review cell model, analogies, pictures *Virtual tour through a cell* http://gslc.genetics.utah.edu/units/basics/cell/ *General Science* www.accessexcellence.com *Cell structure and function* http://darwin.nmsu.edu/~molbio/cell/Page1.html *Cell activities* http://www.kumc.edu/gec/lessons.html	PowerPoint, poster, labeling model — example rubric
C. Cell Membrane (3 days)		
1. Membrane transport 2. Structure	Identify structures, discuss transport, investigate osmosis-diffusion labs *The Great Egg Experiment* This lab is based on the principles of osmosis and diffusion though a cell membrane. The lab takes about a week and various solutions (salt, sugar, etc—students may bring liquids from home) may be used to test scientific hypotheses relating to osmosis and diffusion.	Lab write up

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
D. Cell Function (14 days)		
12.4.5 Matter, Energy, and Organization in Living System a. Investigate and understand that living systems require a constant input of energy to maintain their chemical and physical organization. b. Investigate and understand that producers use solar energy to combine molecules of carbon dioxide and water into organic compounds. **12.5.2 Geochemical Cycles** a. Investigate and diagram how elements and compounds on Earth move among reservoirs in the solid Earth, oceans, atmosphere, and organisms as part of geochemical cycles.		
1. Photosynthesis a. Formula of reaction b. Structures involved	Discussion, Photosynthesis Lab, Microscope activity, Internet Activity *Fast Plants* http://www.fastplants.org High School Biology Labs Based on Plants. Multiple activities for various types of learning environments. Wonderful website!	Quiz Lab Write up
2. Respiration	Discussion, Respiration Lab, Microscope activity, Internet Activity *Fermentation Laboratories* http://www.uwrf.edu/biotech/workshop/activity/act1/act1.pdf Multiple fermentation laboratories and how they relation to the biotechnology industry and everyday life *Fermentation Lab* Using yeast and glucose solutions, and measuring the amount of carbon dioxide, students will be able to measure respiration and how much respiration has occurred, using different variables, such as temperature, amount of yeast, and glucose. Probeware can be used to collect and compare data from germinating pea seeds in germinating and non-germinating plants. *Respiration of Sugars* Probeware can be used to test and measure the respiration of various different types of sugars by yeast.	Quiz Lab Write up

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
3. Geochemical cycles a. Water b. Carbon-Oxygen c. Nitrogen	Discussion	Quiz
4. Cell division a. Cell Cycle b. Mitosis c. Meiosis	Discussion, View onion root tips, Internet Activity *Time for Mitosis* Observing stained slides of onion root tips and estimating the length of time that it takes for each stage of the cell cycle. *Cell Reproduction Activity* Mitosis and/or Meiosis Processes Using Yarn—Simulation of mitosis and/or meiosis using different colors of yarn to represent parts of cells to go through the changes and stages in mitosis or meiosis. *Onion root tip slides* http://www.kumc.edu/instruction/medicine/anatomy/histoweb/cytology/cytology.htm *Cell, mitosis, meiosis, organelles, general science* http://science.nhmccd.edu/biol/ap1int.htm *Worksheet for traditional mitosis microscope lab* http://www.troy.k12.ny.us/thsbiology/labs_online/home_labs/mitosis_lab_home.html	Quiz Lab Write up

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
E. Multicellular Organization (1-2 days)		
1. Cell specialization	*Variety is the Spice of Cellular Life* http://www.nytimes.com/learning/teachers/lessons/20011218tuesday.html Exploring the Vast Array and Functions of Cells Throughout the Human Body, Including Stem Cells *A New You!* http://www.nytimes.com/learning/teachers/lessons/20001107tuesday.html Learning How Stem Cells Can Repair the Body	
12.6.2 Interactions of Science & Technology (Implemented throughout)		
a. Explain how science advances with the introduction of new technology. b. Understand creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering. c. Contrast the reasons for the pursuit of science and the pursuit of technology. d. Contrast the reporting of scientific knowledge and the reporting of technical knowledge.		
1. Research Current Technology 2. Classroom Technology a. Microscope	Comparative writing assignment *Comparison of microscope technologies* www.nobel.se/physics/educational/microscopes/1.html *Microscope general knowledge and activities* http://www.cas.muohio.edu/mbi-ws/microscopes/types.html	Report
12.7.6 Technology in local, national, and global challenges (1 day)		
1. Discussion of Current Events & Technology	1 day research	Oral Report

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
12.4.2 Understanding Heredity a. Investigate and describe how DNA carries the genetic code. b. Investigate and explain how some mutations could help, harm or have no effect on individual organisms. c. Investigate and explain how mutations in sex cells, but not in body cells, could be passed on to offspring.		
A. Structure of Nucleic Acid (9-11 days)		
1. DNA a. Structure b. Replication c. Base Pairing 2. DNA Mutations a. Deletion b. Insertion c. Inversion d. Translocation e. DNA translation	Discussion, Electrophoresis Gel, Models *Dropping Your Genes: A Genetics Simulation* Students determine their genotypes for five inherited traits and determine their sex chromosomes. Gametogenesis is simulated by dropping their paper chromosomes with a person of the opposite sex. Students organize their resulting child's genotype and phenotype on a data table and create a birth announcement. *DNA Activities* www.quia.com/jfc/239046.html http://www.kumc.edu/gec/lessons.html *Mutation* http://gslc.genetics.utah.edu http://genetics-education-partnership.mbt.washington.edu *DNA* http://genetics-education-partnership.mbt.washington.edu www.kumc.edu www.quia.com	Identification Quiz

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
12.8.3 Historical Contributors e.g. Watson, Crick, & Franklin a. Investigate and describe the contributions of diverse cultures to scientific knowledge and technological inventions. b. Understand that changes in scientific knowledge evolve over time and almost always build on earlier knowledge. c. Understand that some advancements in science and technology have long-lasting effects on society.		
3. Protein Synthesis a. Effects of mutation on DNA translation	Discussion, Protein Synthesis Simulations *Protein Synthesis* http://www.accessexcellence.org/AE/AEPC/WWC/1994/protein_synthesis.html Protein synthesis activity for the classroom uses an analogy of protein synthesis and a candy factory. Complete lesson. http://science.nhmccd.edu/biol/bio1int.htm#protein Several very good animations of cellular processes (as well as many other topics) that can be shown to the class via a projector or used by individual students with a question sheet (not provided). http://www.pbs.org/wgbh/aso/tryit/dna/protein.html Protein synthesis activities for the computer include a section about people and discoveries associated with the topic.	Quiz Writing Evaluation
B. Basic Genetics (5 days)		
1. Genetic Variation/Crossover	Discussion, Modeling *Who Gets the Money?* An investigation to solve a mystery involving genetics. Concepts involved are incomplete dominance, Punnett squares, sex-linked inheritance, monohybrid crosses, and codominance. *Genetics* http://www.kumc.edu/gec/lessons.html	Quiz Model Explanation

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
C. Mutations (1 day)		
1. Helpful mutations 2. Harmful mutations 3. Transmission	*Allele Frequencies and Sickle Cell Anemia Lab* *Background Link* http://genetics-education-partnership.mbt.washington.edu/class/activities/HS/sickle-back.htm *Laboratory Link* http://genetics-education-partnership.mbt.washington.edu/class/activities/HS/sickle-bean.htm	
12.6.2 Interactions of Science & Technology (Implemented throughout unit) a. Explain how science advances with the introduction of new technology. b. Understand creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering. c. Contrast the reasons for the pursuit of science and the pursuit of technology. d. Contrast the reporting of scientific knowledge and the reporting of technical knowledge.		
1. Research Current Technology 2. Classroom Technology a. Electrophoresis Gel	Discussions Implemented Throughout Unit *Online Gel Electrophoresis Lab* http://gslc.genetics.utah.edu/units/biotech/gel/ Very Good Flash Animation	
12.7.6 Technology in local, national, & global challenges (1 day) a. Understand that knowledge of basic concepts about scientific and technological challenges should precede active debate. b. Investigate and understand that social issues and challenges may affect advancements in science and technology. c. Understand that science and technology are essential social enterprises that indicate what could happen, but not what should happen.		
1. Discussion of Current Events and Technology	1 day Research *Stem Cell Research* http://learn.genetics.utah.edu/units/stemcells/index.cfm *Cloning* http://gslc.genetics.utah.edu *Genetically-modified Organisms* http://www.pbs.org/now/classroom/genes.html	Oral report

SECTION IV **INTERDEPENDENCE OF ORGANISMS**

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
Interdependence of Organisms (28 days):		
12.4.4 Interdependence of Organisms a. Investigate and describe the flow of energy through ecosystems, in one direction, from producers to herbivores to carnivores and decomposers. b. Investigate and cite examples of organisms cooperating and competing in ecosystems. c. Investigate and understand that interactions among organisms are affected by the conflict between an organism's capacity to produce infinite populations and the finite amount of resources. d. Investigate and describe how humans modify the ecosystem as a result of population growth. **12.7.3 Natural Resources** a. Investigate and explain how human populations use environmental resources to maintain and improve their existence. b. Investigate and understand that the earth has renewable and finite resources. c. Investigate and understand the limitations of natural systems to recycle resources. **12.7.1 Personal & Community Health** a. Investigate and describe the effect of nutritional balance on growth, development, and personal well-being. b. Investigate and explain how diseases are prevented, controlled, and cured. c. Investigate and explain how genetics traits affect a person's health. d. Investigate and analyze risks and benefits in making decisions about personal and community health.		
1. Energy Pyramid 2. Carrying Capacity 3. Cooperation and competition among organisms 4. Population Biology a. Nutrition b. Personal Well-being c. Disease d. Genetic Predisposition	P*ersonal Health* http://www.nytimes.com/learning/teachers/lessons/pershealth.html A whole list of lesson plans from the New York Times Science and Health learning web site. These plans include activities, information, and handouts on current topics in the new on personal health.	Interpretation of Diagrams Project Rubric Present Project Compare Outcomes Vocabulary Quiz Research Project Report

Concepts and Skills	Suggested Activities And Resources	Suggested Assessments
12.7.2 Effects of Population Change a. Investigate and identify causes of population growth or decline. b. Investigate and explain how various factors influence birth rates and death rates. c. Investigate and predict how population change may impacts resource use and environments.		
	Population Biology Environmental Biology http://www.mms.gov/omm/pacific/kids/Tidepool_Math/tidepool.htm This web site provides two different sets of lesson plans that integrate science and math in the context of having students examine the organisms in a tidepool environment. One set of plans is for students in grades K-8, while the other set is intended for high school students.	
12.7.4 Environmental Quality a. Investigate and describe how the positive and negative consequences of human intervention or nonintervention impact the ecosystem. b. Investigate and explain factors which may influence environmental quality.		
1. Human Impact	*Ecology (Environmental Quality)* http://caplter.asu.edu/explorers/index.htm This Internet site offers students in grades K-12, living in the Central Phoenix Arizona metropolitan area, an opportunity to conduct schoolyard research on the interactions between the ecosystem and the urban environment. Four protocols for studying arthropods, birds, and vegetation are provided. *Build a Prairie* http://www.bellmuseum.org/distancelearning/prairie/ Interactive web site that lets you choose the grasses, flowering plants, and animals that you would like to include in your prairie.	

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
12.7.5 Natural & Human induced Hazards a. Investigate and describe how human activities increase or reduce the potential for hazards. b. Investigate and distinguish between slowly and rapidly occurring natural hazards and their impact on the environment.		
	Bottle Biology http://www.bottlebiology.org/ Study a whole host of environments and then alter the quality of the environment and see what happens! Great hands on experiments for all students.	
12.8.3 Historical Contributors a. Investigate and describe the contributions of diverse cultures to scientific knowledge and technological inventions. b. Understand that changes in scientific knowledge evolve over time and almost always build on earlier knowledge. c. Understand that some advancements in science and technology have long-lasting effects on society.		
	Research the contributions of individuals of cultural diversity like Aldo Leopold & E.O. Wilson	Oral Report
12.6.2 Interactions of Science & Technology a. Explain how science advances with the introduction of new technology. b. Understand creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering. c. Contrast the reasons for the pursuit of science and the pursuit of technology. d. Contrast the reporting of scientific knowledge and the reporting of technical knowledge.		
1. Research Current 2. Technology 3. Classroom Technology		

SECTION V **EVOLUTION AND DIVERSITY**

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
Evolution and Diversity (12 days) Wondering How to Present Evolution? You are not alone in this matter…. so the people at Berkley have a few ideas for you! Visit this wonderful website on how to present evolution to high school students. It is the most helpful resource we have seen yet in presenting the subject of evolution! http://evolution.berkeley.edu		
12.4.3 Biological Evolution a. Understand that the concept of biological evolution is a theory which explains the consequence of the interactions of: (1) the potential for a species to increase its numbers; (2) the genetic variability of offspring due to mutation and recombination of genes; (3) a finite supply of the resources of life; and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring. b. Investigate and use the theory of biological evolution to explain diversity of life. c. Investigate whether natural selection provides a scientific explanation of the fossil record and the molecular similarities among the diverse species of living organisms. d. Investigate and use biological classifications based on similarities. e. Identify the series of changes that occur in objects, organisms, and natural and human designed systems. (12.1.5) f. Explain how a system at equilibrium is affected by change. **(**12.1.5) **12.8.3 Historical Contributors** a. Investigate and describe the contributions of diverse cultures to scientific knowledge and technological inventions. b. Understand that changes in scientific knowledge evolve over time and almost always build on earlier knowledge. c. Understand that some advancements in science and technology have long-lasting effects on society (i.e. mechanisms for evolution and changes in the gene pool).		

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
A. Evolution (6 days)		
1. Theory of Evolution a. Linking Evidences b. Mechanisms of Evolution	Darwin, Voyage of the Beagle, Discussion, Video *Nine Day Lesson Plan for Teaching Human Evolution* http://www.indiana.edu/~ensiweb/lessons/unt.he.f.html This site contains a nine day, step-by-step, lesson plan for the teaching of evolution. It includes handouts and workbooks. *The study of human evolution begins with your DNA* http://www.geneticorigins.org/geneticorigins/ This Internet site, maintained by the Dolan DNA Learning Center at Cold Spring Harbor Laboratory, provides two complete lessons for studying evolution through DNA fingerprinting. Lesson titles include Mitochondrial (mt) Point Mutations and Alu Insertion Polymorphism. *Explorations Through Time* http://www.ucmp.berkeley.edu/education/explotime.html This Internet site, from the University of California Museum of Paleontology, provides seven lesson plans, centered on web activities that explore the history of life on Earth. The lessons are divided into three groups based on age, although most overlap, and focus on teaching students content along with the process of science.	Position Statement Personal Observation Paper

Concepts and Skills	Suggested Activities And Resources	Suggested Assessments
2. Consequences of the Interaction between a. Potential for species to increase numbers b. Genetic Variability c. Finite Supply of Resources d. Selection of the Fittest	*Genetic Variability* http://dev.nsta.org/ssc/moreinfo.asp?id=1002 *Survival of the Fittest Lesson Plans* http://www.nationalgeographic.com/xpeditions/lessons/08/g912/crocssurvival.html	
B. Diversity (6 days)		
12.1.1 Develop an understanding of systems, order, and organization a. Predict and evaluate how change within a system affects that system. b. Design solutions to problems identified within a system. **12.4.6 Behavior Patterns Evolved through Natural Selection** a. Investigate and explain how the behavioral patterns of organisms have evolved through natural selection. **12.4.6 Respond to External and Internal Stimuli** a. Investigate and describe how organisms respond to internal changes and external stimuli. **12.8.3 Historical Contributors** a. Investigate and describe the contributions of diverse cultures to scientific knowledge and technological inventions. b. Understand that changes in scientific knowledge evolve over time and almost always build on earlier knowledge. c. Understand that some advancements in science and technology have long-lasting effects on society (i.e. modifications is placement of organisms in the classification system and interrelationship of characteristics between different types of organisms).		
1. Natural Selection	Biodiversity http://www.ucmp.berkeley.edu/education/explotime.html	
2. Classification	Dichotomous Key Activity *Linnaeus System of Classification* http://anthro.palomar.edu/animal/animal_1.htm Research contributions made by scientists of diverse culture like Aristotle and Linnaeus **http://www.brooklyn.cuny.edu/bc/ahp/CLAS/CLAS.Linn.html** *Classification Song* http://www.science-groove.org/SSA/Contest01/Linneaus.html	Completed Key Oral report

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
12.6.2 Interactions of Science & Technology a. Explain how science advances with the introduction of new technology. b. Understand creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering. c. Contrast the reasons for the pursuit of science and the pursuit of technology. d. Contrast the reporting of scientific knowledge and the reporting of technical knowledge.		
1. Research Current Technology 2. Classroom Technology	Research	Reporting Research Lab Write up
12.7.6 Technology in local, national, & global challenges a. Understand that knowledge of basic concepts about scientific and technological challenges should precede active debate. b. Investigate and understand that social issues and challenges may affect advancements in science and technology. c. Understand that science and technology are essential social enterprises that indicate what could happen, but not what should happen.		
1. Discussion of Current Events & Technology	Research	Oral Report